KELLERCO

DATE: September 19, 2002

TO: Larry Miller
Ron Mabry
Rick Carr

FROM: C. Richard Keller

SUBJECT: Assessment Of Traffic Impact Associated With The Northern Area Park To Be Opened In 2004 East Of Marshall

This technical memo documents the traffic impact associated with the construction by 2004 of the entire Northern Area Park facility on an 88-acre tract east of Marshall on Route 55.

PROPOSED NORTHERN AREA PARK

Exhibit 1 shows the park's location in western Fauquier County and Exhibit 1a shows the 88-acre tract's location with respect to Marshall and The Plains. Exhibit 2 shows the current conceptual master plan for the park. Note the following park access elements and related issues.

1. There will be no park access via Whiting Road (Route 622).
2. The only vehicular access to the park will be via a main entrance/exit on Route 55.
3. An emergency access only connection between the park and two adjacent County schools will be provided.

    - The Marshall Middle School
    - The W.G. Coleman Elementary School

    The public currently has access to a ball field, two tennis courts and a soccer field at the Marshall Middle School and two ball fields at the W.G. Coleman Elementary School. These school facilities would still be available to the public once the new park is built. New vehicular access between the park and the W.G. Coleman Elementary School was discussed previously by school and parks and recreation officials but it was eliminated due to cost. Such a vehicular connection

would create more traffic at the W.G. Coleman Elementary school entrance on Route 709 which has limited sight distance. Most large parks however, have an emergency or second access route available for emergency and occasional special event traffic.

It should also be noted, were pedestrian access provided between the schools and the park, it would provoke Northern Area Park users to park at the schools and walk to some nearby park facilities. Therefore, new park traffic may still be created at the school driveways with a pedestrian connection for users who wish to walk to the new park. Also, a new pedestrian connection between the park and schools will not promote use of the park facilities by school children because of time limitations associated with school activities.

4. A 10' bikeway is indicated on the detailed site plan on the west side of the main park entrance/exit roadway. This implies the future need for a bikeway along the north side of Route 55, especially west toward Marshall.
5. It was noted during a field reconnaissance that a tract is for sale on the south side of Route 55 at the main park entrance/exit. Access to this tract may need to be coordinated with park access to avoid vehicular conflicts.

EXISTING TRAFFIC SITUATION

In order to establish a basis for determining the peak hour traffic impact with the park fully developed by 2004, it was first necessary to count traffic at three intersections on Route 55 designated by the County staff.

1. Route 55/622
2. Route 55/709
3. Route 55/626/245 at The Plains

Exhibit 3 shows the location of these three intersections on the Route 55 corridor. On Thursday, May 9, 2002 between 3:30 PM and 8:00 PM and on Saturday, May 11, 2002 between 10:00 AM and 7:15 PM vehicular turning movement counts were made simultaneously at each of these three intersections. The traffic count periods were made to coincide with peak park traffic periods. Weekday late afternoons and evenings will experience park traffic and Saturdays will experience park traffic throughout the day.

Appendix A contains the actual traffic counts as recorded and Exhibits 4 and 4a depict the peak hour traffic volumes. Note that the intersection peak hour volumes are very similar for a Thursday as compared to a Saturday. HCS software was used to determine the unsignalized intersection levels of service (LOS) which are also shown in Exhibits 3 and 3a. Both the Thursday and Saturday peak hour levels of service were excellent and very similar at LOS B and C. The HCS results are shown in Appendix A1. It should be noted that LOS results reflect the amount of congestion or vehicle delay at an intersection; with A, B or C being the desired LOS. LOS D or E would tend to indicate

more significant side street delay due to higher main street (Route 55) volumes. Such delay can sometimes be eliminated by widening or even signalization.

THURSDAY PEAK HOUR TRAFFIC SITUATION

The peak hour volumes reflect the following traffic flow characteristics for a Thursday.

- Route 622 north served the lowest two-way roadway link volume of 28.
- Route 55 west of Route 622 served the highest two-way road link volume of 474.
- Route 55 between Route 622 and Route 709 served the second highest two-way road link volume of 454 to 455.
- Route 55 east of The Plains served the third highest two-way road link volume of 420.
- Route 709 north of Route 55 served the fourth highest two-way road link volume of 417 primarily due to the two schools located on Route 709.
- Note the high right and left turn movements to/from Route 55 at Route 709 north of 148 and 85 which helps to reduce the Route 55 volumes east of Route 709 toward The Plains.
- The unsignalized intersection levels of service ranged from LOS B at Locations 1 and 3 to LOS C at Location 2.

SATURDAY PEAK HOUR TRAFFIC SITUATION

The peak hour volumes reflect the following traffic flow characteristics for a Saturday.

- Route 622 south served the lowest two-way roadway link volume of 18 not Route 622 north of 20.
- Route 55 west of Route 622 served the highest two-way road link volume of 466 just lower than the Thursday PM volume of 474.
- Route 55 between Route 622 and Route 709 served the second highest two-way road link volume of 454 to 447 which is very similar to the 454/455 on a Thursday.
- Route 55 east of The Plains served the third highest two-way road link volume of 402 as compared to 420 on a Thursday.
- Route 709 north of Route 255 served a significantly lower two-way road link volume of 256 as compared to 417 on a Thursday.
- The unsignalized intersection levels of service ranged from LOS B at Locations 1 and 3 to LOS C at Location 2.

WEEKDAY TRAVEL TIMES FOR THE PARK SITE

As Exhibit 5 indicates, Route 709 south provides a very convenient access route to the park for patron traffic generated in the Warrenton area. This convenience via Route 709 was confirmed by travel time runs done on a July weekday at 4:00 PM. The results for Route A via Routes 709 and 55 as compared to Route B via Routes 17, 17 Business, Old Stockyard Road and 55 are illustrated on Exhibit 5 and compared below.

- Via Route A: 3 minutes travel time; over 2.1 miles
- Via Route B: 6 minutes travel time; over 3.3 miles

This very significant difference in travel times means that park traffic which originates to the south and uses the Route 17 corridor will learn to use the Route 709 corridor for park access rather than proceeding to Marshall for park access. In the future, with more traffic in the Marshall area, Route 709 will become the preferred access route for new residents and land uses east of Marshall along the Route 55 corridor.

PROCESS FOR PROJECTING NORTHERN AREA PARK GENERATED TRAFFIC

After checking available sources such as ITE (the Institute of Transportation Engineers), Loudoun County and other sources for trip generation rates to use for the Northern Area Park, it was determined that acceptable trip rates were not available for comparable park/pool sites. A comparable nearby park however was identified which is very similar to the proposed park. The comparable park, Franklin Park, is located between Round Hill and Purcellville in Loudoun County.

FRANKLIN PARK VERSUS NORTHERN AREA PARK

While Franklin Park is significantly larger in land area, 194 acres versus 88 acres for the Northern Area Park, the on-site facilities are very similar. This park is located west of Leesburg in a lower density area near two small towns. Franklin Park serves residents of western Loudoun County and probably some residents of West Virginia's "panhandle" counties. Exhibit 6 compares the facilities at each park. Purcellville provides no comparable park facilities to Franklin Park, so (like Marshall residents) residents use Franklin Park facilities.

Since Franklin Park facilities and its location is so similar to the proposed park, it was selected for specific trip generation surveys which could be applied to Northern Area Park facilities to establish expected traffic when it opens in 2004.

TRAFFIC SURVEY RESULTS AT FRANKLIN PARK

Exhibit 7 depicts the site plan facilities at Franklin Park and the two basic traffic count locations, Intersections 1 and 2. Since the Route 7 Business access point is the only park entrance/exit, all park traffic was counted at Location 1 and separate playing field traffic was counted at Location 2. Franklin Park is open from 6:30 AM (dawn) to 8:30 PM (dusk). A typical weekday is Thursday (worse weekday due to playing field schedules) when playing fields are very active from 4:00 PM to 8:30 PM. Typical Saturday activities extend from 7:00 AM to 4:00 PM. Sundays can also be busy with a variety of activities plus occasional entertainment. It should also be noted that Franklin Park is not lighted and therefore closes at dusk.

Because Franklin Park facilities are built on a 194-acre tract, it was observed that sufficient overflow parking is available in vacant fields to accommodate special events. For example, for the recent U.S. Pony League tournament, according to the Park Manager, several thousand cars were parked at the park which has only 499 designated spaces.

Traffic Surveys/Dates

In order to survey representative traffic conditions for verifying Franklin Park trip generation rates, the following surveys were conducted by KELLERCO using temporary trained staff. The traffic count data summaries are included in Appendix B.

- *A Weekday 4:00-8:00 PM Survey with Pool Closed (See Appendix B1)*

  A typical weekday PM situation was surveyed on Thursday, May 16, 2002 by counting traffic at Locations 1 and 2 between 4:00 PM and 8:00 PM. The park manager indicated that the Thursday PM period is more active than other days earlier in the week because activities are well scheduled in advance of related weekend; i.e. Saturday and Sunday, activities.

  This survey provided important park trip generation data which can be used in combination with the Thursday PM traffic counts at these intersections on Route 55.

- *Saturday Survey with Pool Opened (See Appendix B2)*

  A typical Saturday daily situation was scheduled for May 19, 2002 but it was cancelled due to rain. The pool was closed had the survey been conducted. The next Saturday was May 25, 2002, Memorial Day weekend, which was the day when the pool first opened. Saturday was surveyed at Locations 1 and 2 from 7:00 AM to 7:00 PM so it therefore includes opening day pool traffic which may have been low due to the holiday weekend. It also represents a Saturday on a holiday weekend.

- *Sunday Survey (See Appendix B3)*

  In order to establish traffic conditions on a Sunday when a full day of entertainment was scheduled, a survey from 7:00 AM to 8:00 PM was conducted at Locations 1 and 2. The W.O.W. Festival was well advertised with live entertainment beginning at 1:00 PM and extending to 7:00 PM. The entertainment occurred on a stage near the four ball fields and not at the Barns. It was surveyed to represent a worse case Sunday condition and not a less attended amphitheater event. The data were not used to assess traffic impact, only for information purposes.

- *Park Patron Car Occupancy Survey (See Appendix B4)*

  Car occupancy was surveyed on Saturday, May 25, 2002 during the PM period. The results indicated an average of 2.1 persons per vehicle.

Weekday Hourly and PM Peak Hour Park Generated Traffic with Pool Closed

Exhibit 8 depicts the hourly in/out traffic at Franklin Park on a Thursday between 3:30 and 7:30 PM. Note the higher inbound arrivals between 3:30 and 6:30 (110 and 114) which reflects increased activity at the playing fields. The exact peak hour occurred between 4:45 and 5:45 with 126 ins and 88 outs. Note that since the pool was closed, no pool traffic is reflected in these volumes. This 4:45-5:45 PM peak hour is close to the 4:30-5:30 PM peak hour at the two Route 55 intersections next to the park (see Exhibit 4).

Saturday Memorial Day Weekday Hourly Generated Traffic on Pool "Opening" Day

Exhibit 9 depicts the hourly in/out traffic at Franklin Park on this Memorial Day weekend Saturday; i.e. Memorial Day was celebrated on Monday, May 27, 2002. Even though the pool was officially opened this day, the pool traffic was probably lower than normal. For example, between 7:00 AM and 7:00 PM the pool attracted only 59 trips to and 65 trips from the pool with the peak hour occurring between 4:00-5:00 PM when there were 8 trips to the pool and 13 trips from the pool. We have been advised that the pool could generate as many as 500 patrons on a more typical Saturday.

The peak hour on Saturday occurred between 4:00-5:00 PM due to the high volume of exiting traffic. Between 10:00-11:00 AM there were 63 trips to the park and 36 trips from the park. This park peak hour is similar to the traffic peak hour (10:30-11:30) at the Route 55/709 intersection (see Exhibit 4a).

Sunday W.O.W. Entertainment Generated Traffic

Exhibit 10 indicates the hourly in/out traffic at Franklin Park on this special event day. Compared to the Saturday data shown on Exhibit 9, note the high volume of hourly traffic into the park between 12:00 noon and 3:00 PM and the high volume of hourly traffic from the park between 3:00 PM and 7:00 PM. The exact peak hour for total volumes occurred between 2:30-3:30 PM with 120 trips to the park and 130 trips from the park. On this special event day, the highest hourly volumes to the park are nearly twice as high as on Saturday; 70 versus 139, and the highest hourly volumes from the park are nearly equal; 119 versus 120.

Summary of Franklin Park Traffic Surveys

Exhibit 11 summarizes the Franklin Park survey traffic for a weekday and Saturday and indicates the total traffic generated by the park including the park's peak hour traffic and the park's traffic when the Route 55 intersection traffic peaked. Note the following.

1. The Thursday peak hour traffic generated by the park was higher than on Saturday; 214 versus 173, probably due to the scheduled playing field activities on Thursday.
2. The Sunday W.O.W. entertainment day generated significantly more daily traffic than on Saturday; 1,339 versus 972.
3. Peak hour traffic for the park at 4:00-5:00 PM on Saturday (with or without the pool traffic) and 4:45-5:45 PM on Thursday is significantly higher than park traffic when peak hour traffic occurred at the three Route 55 intersections. On Saturday, the park traffic peaked at 4:00-5:00 PM whereas the Route 55 intersection traffic peaked at 10:15-11:15 AM.
4. On Saturday, opening day for the pool, the pool generated 124 of the 972 total trips between 7:00 AM and 7:00 PM or 12.8% of the total trips.

This park traffic data for the Route 55 intersection peak hours is relevant because the traffic impact analysis is initially based on the weekday and Saturday traffic counted at three intersections without a park built. Therefore, assuming that Franklin Park's traffic is typical of what to expect from the Northern Area Park when it is completely built, the following Northern Area Park (without a pool) traffic would be expected to use the Route 55 corridor in 2004.

	To Northern Area Park	From Northern Area Park	Total
Wednesday 4:30-5:30 PM Park Traffic (Without Pool)	110	73	183
Saturday 10:15-11:15 AM Park Traffic (Without Pool)	43	51	94

ADDITIONAL SURVEY FOR WEEKDAY POOL OPENING AT FRANKLIN PARK

Now that the pool has been open for more than a month, a traffic count was made at the Franklin Park pool on Tuesday, July 30, 2002 (an extremely warm, humid day) to obtain weekday pool traffic data which was not available when the Thursday, May 16, 2002 count was made because the pool was closed. The results of this "pool only" 3:00 PM to 5:30 PM traffic count is indicated below.

	Pool Traffic			
67 vehicles were parked at the pool at 3:00 PM	To Pool	From Pool	Total	One Hour Total
3:00-3:30 PM	19	10	29	
3:30-4:00 PM	8	25	33	62
4:00-4:30 PM	10	11	21	54
4:30-5:00 PM	11	14	25	46
5:00-5:30 PM	5	10	15	40
Peak Hour 4:30-5:30 PM	16	24	40	

At the beginning of the traffic count, 65 cars and 2 school buses (67) were parked at the pool and at the end of the count at 5:30, 50 cars were parked at the pool. These data indicate that 62 trips occurred between 3:00-4:00 PM, the highest hourly volumes and only 40 trips occurred between 4:30-5:30 PM. These data indicate that for a weekday the following pool traffic should be considered to be generated for the "pool only" located at the Northern Area Park assuming that the Franklin Park traffic is typical for the Northern Area Park.

	To Northern Area Park	From Northern Area Park	Total
Tuesday 4:30-5:30 PM (Pool Traffic Only)	16	24	40

SUMMARY OF NORTHERN AREA PARK GENERATED TRAFFIC

Assuming that Franklin Park in Loudoun County is similar to the proposed Northern Area Park in that is serves a similar population of need in 2004, then the following Thursday trips would be anticipated for the purpose of assessing the traffic impact the park will have on three Route 55 intersections in 2004.

	Without Pool			With Pool		
	In	Out	Total	In	Out	Total
Thursday 4:30-5:30 PM	110	73	183	126 (+16)	97 (+24)	223

For Saturday, the low Memorial Day pool trips were increased by a factor of 4 to represent a more typical Saturday pool operation. This factor of 4 was based on the following assumptions.

- On the Memorial Day survey, the pool generated the following traffic between 7:00 AM and 7:00 PM.

  In: 59
  Out: 65
  Total: 124

Average of ins/outs: 62

If 62 daily patron cars have an average car occupancy of 2.1 persons, then these cars reflect 130 total pool patrons (62 x 2.1 = 130).

- If on a typical Saturday pool day 500 patrons are served, then this represents 3.85 times the Memorial Day patronage; i.e. 500 ÷ 130 = 3.85. A 4 factor was therefore applied to the surveyed Memorial Day Saturday pool peak hour trips shown below to represent a more typical Saturday situation.

	In	Out	Total	In	Out	Total
Saturday Memorial Day "Pool" 10:15-11:15	43	51	94	57 (+14)	55 (4)	112
Adjusted "Pool" Saturday 10:15-11:15	43	51	94	99 (+56)	67 (+16)	166

GEOGRAPHIC DISTRIBUTION OF NORTHERN AREA PARK GENERATED TRAFFIC

The Parks and Recreation staff for Fauquier County considered the following information in developing a geographic distribution for traffic expected to be generated by the Northern Area Park when it is opened.

1. CURRENT SCHOOL BUS RIDER DISTRIBUTION

   The current geographic distribution of students who ride school buses which access the W.G. Coleman Elementary School and the Marshall Jr. High School is indicated below.

   - From the:
     North: Coleman 19; Jr. High 11 = 30 (3.7%
     East: Coleman 42; Jr. High 115 = 157 (19.6%
     West: Coleman 280; Jr. High 270 = 550 (68.7%
     South: Coleman 31; Jr. High 33 = 64 (8.0%)
     Total Students = 801

   Note that nearly 70% of the students currently originate to the west and 20% to the east of the park site.

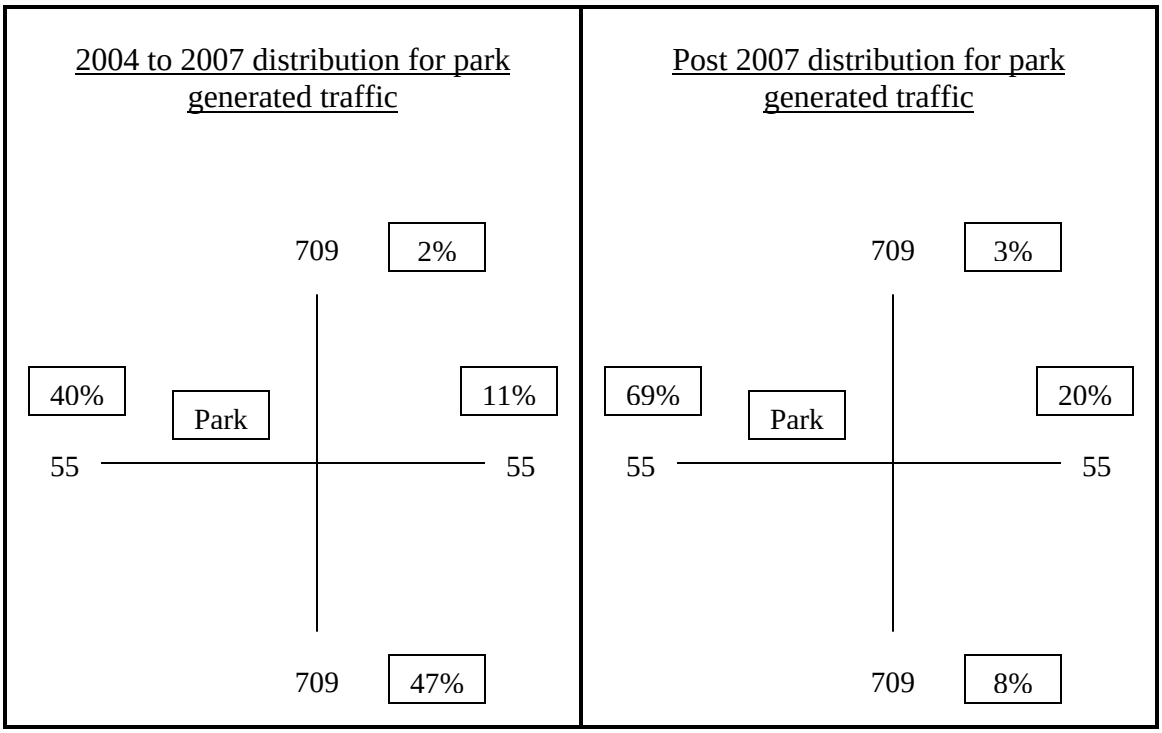
2. COUNTY POPULATION EXPECTED TO BE SERVED BY THE PARK BETWEEN 2004 AND 2007 AND POST 2007

   The Youth Sports Council estimates that 1,380 children will have a desire to use the new park when it opens in 2004. However, once the central/southern and other

recreation facilities in the County open by 2007, this estimate would drop to 600 children.

Assuming that the 1,380 children represent a population of approximately 23,000 northwest of the Route 29/211 corridor per the Department of Community Development then post 2007 the 600 children served would represent a population of approximately 10,000. This means that between 2004 and 2007 the park will serve a larger more dispersed market than post 2007 when more recreational facilities will be available in the County.

In view of this current and projected information regarding the market served by the new park, two geographic distributions were estimated; one for 2004 to 2007 and one post 2007 as indicated below.



Applying the 2004 to 2007 park trip distribution to the previously estimated weekday and Saturday peak hour Northern Area Park with a pool results in the park traffic assignments shown in Exhibits 12 and 12a.

2004 TRAFFIC WITHOUT NORTHERN AREA PARK

In order to achieve the 2004 peak hour volumes without Northern Area Park developed, the existing 2002 Thursday (Exhibit 4) and Saturday (Exhibit 4a) volumes were increased by an annual growth rate of +4% per year compounded for two years (factor of 1.0816). The resulting 2004 "background" peak hour volumes are shown in Exhibits 13 and 13a.

2004 WITH NORTHERN AREA PARK WITH POOL

Next, the Northern Area Park traffic was added to the Exhibit 13 and 13a 2004 background volumes to achieve the Exhibit 14 and 14a 2004 peak hour volumes with the park built with a pool. HCS software was applied to the intersection volumes with the results shown in Appendix C.

The HCS results in 2004 with the park/pool open and increased "background" traffic on Route 55 would result in the following levels of service as compared to the existing 2002 levels of service reported earlier. Note that Location 1a, the park entrance/exit, has been added for 2004.

THURSDAY			
Location		2002 LOS	2004 LOS
1	55/622	B 12.2	B 14.0
1a	55/Park	n/a	B 13.3
2	55/709	C 15.2	C 24.9
3	55/245	B 14.5	B 13.1

SATURDAY			
Location		2002 LOS	2004 LOS
1	55/622	B 11.4	B 12.8
1a	55/Park	n/a	B 12.6
2	55/709	C 16.0	C 24.0
3	55/245	B 12.8	B 11.6

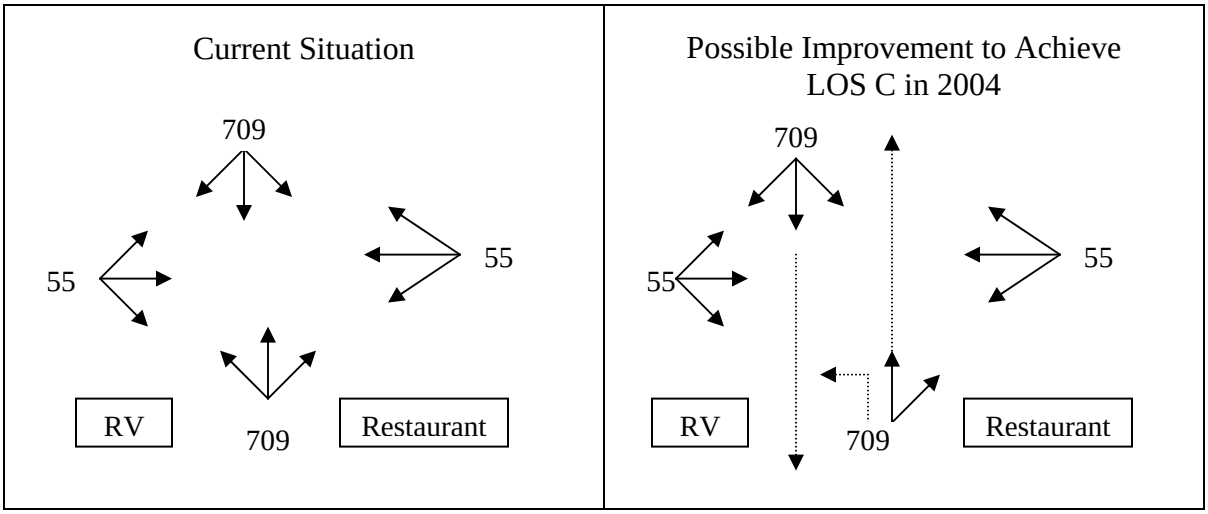
Note that all three intersections remain at the same LOS category in 2004 as in 2002.

It should also be noted however, that Location 2 will be very close to achieving a LOS D in 2004 on both a Thursday and Saturday. The LOS seconds of delay criteria for unsignalized intersections indicates that LOS C is from 15.0 to 25.0 and LOS D is from 25.0 to 35.0. Therefore, both Thursday and Saturday 2004 conditions at Location 2 are very close to a LOS D.

It is true that the additional Thursday/Saturday park traffic from the Route 709 approach from the south contributed to this reduction in LOS C in 2002 to almost a LOS D in 2004. This finding indicates that the Location 2 traffic situation needs to be monitored by VDOT after the park is open for a few months to verify the actual peak hour situation. If the traffic occurs as projected, there would soon be a need to modify this intersection to better accommodate school, park, livestock facility and other traffic if a LOS C is desired.

If sufficient right-of-way is available on the northbound Route 709 approach at the restaurant parking lot and the northbound/southbound through lane alignments on Route 709 can be accommodated, a better LOS C 19.6 can be achieved by simply adding a

northbound left turn lane only as shown below. This would improve the 2004 Thursday PM LOS to C 19.6.



Appendix D contains the HCS runs for this improvement.

CONCLUSIONS

As a result of this traffic impact analysis the following can be concluded. Exhibit 15 illustrates suggested access improvements.

1. Typical park activities will not create significant weekday or Saturday traffic impact on Route 55 when the park opens in 2004.
2. The use of the W.G. Coleman school access to Route 709 for emergency or special event overflow park access could be hazardous due to the limited sight distance for southbound traffic and traffic exiting from the school site. It should be replaced by an emergency and special event overflow park access route to Route 55 between the main park entrance and the Fauquier Livestock entrance/exit. To avoid any traffic conflicts with the livestock facility traffic should this facility traffic occur at the same time as park emergency/special event traffic, the park entrance should be 400' to 500' west of the livestock entrance and a similar distance from the main park entrance.
3. Post 2007 typical park generated traffic will decrease significantly as other recreational facilities are built for County residents.
4. Between 2004 and 2007, when traffic conditions at the park are expected to be higher than post 2007, special event scheduling should be carefully evaluated due to the lack of overflow "designated" parking on site. For example, any overflow parking for special events needs to be accommodated on-site to avoid parking along the shoulders on both sides of Route 55 along the park frontage. Temporary police traffic control should be scheduled for special events to avoid overflow parking which may spill onto Route 55.
5. To avoid unnecessary delays to through traffic on the Route 55 corridor, Route 55 should be widened at the main park entrance to provide a protected left turn lane

eastbound and separate right turn lane westbound. The main entrance should also be located in such a way that land accessed on the south side of Route 55 aligns with the main park entrance.

6. On-site pedestrian and bicycle facilities need to be built in such a way that they can be joined with similar facilities ultimately built between the park and Marshall along the north side of the Route 55 corridor.
7. When the park opens in 2004 with a pool, the additional park traffic will not impact the three study intersections enough to change the Thursday or Saturday midday level of service.
8. After the Park is open for a few months, monitor the Location 2 Thursday PM and Saturday AM peak hour traffic situation and assess the need for modifying the northbound or northbound/southbound Route 709 approaches to achieve LOS C or better.